BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

In the Matter of	)	
	)	
Redevelopment of Spectrum to	)	
Encourage Innovation in the	)	ET Docket No. 92-9
Use of New Telecommunications	)	
Technologies	)	

To: The Commission

COMMENTS OF
QUESTAR CORPORATION

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SUMMARY

Questar has grave concerns that its critical communications systems licensed in the Private Operational-Fixed Microwave Service (OFS) frequency bands 1850-1990 MHz and 2110-2150/2160-2200 MHz will be ejected from their present spectrum locations as a result of the instant proposal to reallocate OFS spectrum to an undefined group of "new technologies." Questar extensively uses these bands to provide critical point-to-point communications for its interstate natural gas pipeline network. These communications include real-time monitoring and remote control of natural gas product flow throughout the Questar network and, accordingly, the communications capability afforded to Questar by this spectrum is absolutely essential to protect the public health and safety throughout the Questar pipeline network area.

Questar is concerned about the Commission's arbitrary choice to limit analysis of candidate frequency bands for new technologies only to spectrum between 1-3 GHz, since numerous spectrum blocks outside this frequency range exist which could accommodate new technologies without the potentially catastrophic disruption of public and environmental safety services which will certainly occur should the Commission reallocate spectrum in the manner proposed. Further, Questar is unconvinced that sufficient present demand for the loosely defined group of services labelled

"new technologies" has been demonstrated to warrant the instant reallocation of 230 MHz of valuable spectrum as proposed.

Moreover, should the Commission determine that an allocation within the 1-3 GHz range is absolutely essential to accommodate new technologies, several bands within that spectrum range other than those now proposed for reallocation could be made available to new technology interests at lower costs and with less harmful disruption to existing services than would be true should the current target spectrum be reallocated. The Commission must fully consider reasonable alternatives which may provide a better spectrum home for new technologies. Until such time as the Commission performs a serious analysis of the need for spectrum in which to accommodate new technologies, as well as a review of all potential spectrum choices in which to accommodate any such need, the Commission will have failed to act within its mandate to allocate spectrum in accordance with the public interest, convenience and necessity and to afford public safety oriented users the highest allocation priority.

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QUESTAR CORPORATION

Questar Corporation ("Questar"), by its attorneys, pursuant to the invitation extended by the Federal Communications Commission ("Commission") in its Notice of Proposed Rule Making (Notice)[1/] in the above-styled proceeding, respectfully submits the following Comments for consideration by the Commission.

I. PRELIMINARY STATEMENT

1. Questar is an integrated natural gas company, comprised of exploration and production, distribution, and transmission subsidiaries. The distribution subsidiary provides natural gas to over a half-million customers throughout Utah and Wyoming. The transmission subsidiary brings gas to local distribution points via a pipeline

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1/ 7 FCC Rcd. 1542 (1992).

network which covers a route of 2,400 miles through Utah, Wyoming, Idaho and Colorado. Questar's production subsidiaries explore and drill for natural gas throughout this four-state territory.

2. Questar's 2 GHz microwave system is absolutely essential to safe pipeline operation and natural gas production activities. Transportation of natural gas via pipeline has proven to be the safest method available. Nonetheless, to prevent potentially severe mishaps, Questar must follow a strict pipeline maintenance and repair schedule. Effective operation of the 2 GHz system is extremely critical to this process. Voice communications on the Questar system coordinates maintenance and repair operations and keeps Questar personnel on alert in the event of an accident. During routine pipeline maintenance activities, aged pipe is regularly replaced to ensure against leaks of highly volatile natural gas. In such operations, the product flow is stopped and the pipe cut open. Any interference to these operations will severely jeopardize worker and public safety, especially in the populated regions through which the pipeline runs.

3. Moreover, Questar's 2 GHz system supports various data operations, the most critical of which is the "supervisory control and data acquisition" (SCADA) function.

Depending on demand, Questar draws gas from up to 200 well sites at any given time. Many of these sites are located in remote rural areas which often have no communication facilities other than Questar's. The SCADA system remotely operates the well-head valves which send gas into the Questar transmission system. During the sensitive transmission and distribution processes, the SCADA system monitors and controls the flow of gas, maintaining pressure and alerting repair crews should data suggest the possibility of pipeline rupture. Certainly, in an operation as critical as the Questar SCADA system there is no tolerance whatsoever for communication link failures.

II. COMMENTS

4. The communications capabilities described above are obviously critical to the public health and safety as well as to the protection of the environment. Such communication capabilities are particularly beneficial to Questar since the Questar pipeline system traverses numerous remote areas where normal common carrier telecommunication facilities are not available. Further, due to the remote and inaccessible nature of portions of the Questar pipeline right-of-way, long-distance microwave paths are necessary to provide the reliable communications service necessary to ensure efficient delivery of natural gas to consumers and to

adequately protect the public's safety and the environment. The unique long-distance propagation characteristics of 2 GHz spectrum make the Questar communications system possible. Accordingly, Questar is extremely concerned with the Commission's allocations proposals under consideration in this proceeding. Questar is pleased to have this opportunity to provide the Commission a full discussion of the ramifications of the proposed reallocation.

A. The Commission Has Not Considered the Public Safety Ramifications of Reallocation of OFS Spectrum

5. The Commission's reallocation proposal will not serve the public interest due to its negative impact on the public health and safety as well as on the environment. Apparently, the Commission presumes that loss of the targeted spectrum bands will not impact current users or the public and/or environmental safety because microwave bands above 3 GHz coupled with fiber optic and satellite technologies will provide adequate replacements for the services made possible through the 2 GHz microwave band.[2/]

6. The Commission's analysis has not considered that frequencies above 3 GHz do not provide the same long-haul capabilities that assignments from the targeted spectrum

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2/ Notice, paragraph 20.

bands offer.[3/] Significantly, the long-distance paths employed in the Questar system operate on assignments from the targeted spectrum. Since frequencies above 3 GHz do not have the same long-distance transmission characteristics of 2 GHz spectrum, replacement with higher range frequencies will force Questar to implement numerous "relay points" in order to provide an acceptable alternative to the service Questar now received from the targeted spectrum. The addition of each such relay point compromises the reliability of the Questar communications system, because the possibility of outages increases substantially with the imposition of each retransmission point. Further, the "rights-of-way" which would be required for construction of additional "relay points" will be prohibitively expensive at best and, in many cases, impossible to obtain due to environmental and/or aesthetic factors. Moreover, the cost of reconfiguring Questar's communication system would be inordinate and routine operational expense problems would be exacerbated due to the imposition of maintenance costs for additional equipment needed to use higher range spectrum.

7. Nor will fiber optic and/or satellite technologies provide an adequate replacement service to Questar for 2 GHz

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3/ See: Statement of Carl Bailey, Chevron Information Technology Company, at FCC en banc hearings on PCS (December 5, 1991).

microwave spectrum losses. Fiber optic systems cannot provide the reliability that microwave radio facilities offer because fiber optic lines are susceptible to breakage. During disasters such as earthquakes, fiber optic facilities are vulnerable, and even in routine activities such as excavation for construction projects, fiber optic cable can be severed resulting in a total loss of services vital for the protection of the public safety and the environment. Questar's concerns about fiber optic reliability are particularly heightened since its pipeline system traverses certain "earthquake prone" areas. As was amply demonstrated during the Loma Prieta earthquake in 1989, fiber optic technology cannot be relied upon to provide critical services in the event of earthquakes.

8. Satellite technology cannot provide an acceptable substitute service, since time delays inherent in signal relay through satellite systems compromise the SCADA system design. This presents a heightened element of danger for systems like Questar's which provide "real time" monitoring and control for sensitive operations such as natural gas wellhead flow and pipeline transmission activities. Further, even if fiber optic and satellite technologies could provide a complete replacement for the Questar microwave system, Questar cannot practically utilize such a

system design since Questar's vital monitoring and control operations would be placed in the hands of commercial communications carriers. In times of outages, quick restoration of services to Questar might not be the first priority of commercial carriers. Questar believes that potential service lapses and system unreliability could result in catastrophic consequences for the health and/or safety of the public throughout the Questar operations area. Questar notes that heightened reliability provided the rationale for the Commission's original private microwave allocations.[4/] In the ensuing years, reliability of the public switched telephone network has not demonstrated any significant degree of advancement.[5/]

9. The Commission must demonstrate that its allocation choices will serve the public interest.[6/] The proposed reallocation does not meet this requirement. The Commission must realize that protection of human health and/or safety is of greater value than possible benefits which might be delivered by proposed new technologies.

4/ In the Matter of Allocation of Frequencies in the Band Above 890 Mc., FCC Docket No. 11866, 27 F.C.C. 359 (1959).

5/ See "Asleep at the Switch?", Federal Communications Commission Efforts to Assure Reliability of the Public Telephone Network; 102d Congress, 1st Session, House Report 102-420 (December 11, 1991).

6/ 47 USCA Section 303(c) (1990).

Moreover, the proposed new services are "convenience oriented" and not vital to the public health and safety as are the OFS operations being performed in the target spectrum. Accordingly, the Commission's arbitrary decision to accord "convenience-oriented" uses a greater value than health/safety uses violates the Commission's statutory[7/] and judicial[8/] directives. The proposed reallocation is detrimental to the public interest and, upon serious analysis, the Commission will see that benefits which might accrue in the future from new technology deployment cannot compete for public value with the safety-oriented services now provided through 2 GHz microwave systems such as those operated by Questar.

7/ 47 U.S.C. Section 151 (1991). Since the addition of the specific directive that the FCC must allocate spectrum in a manner that promotes "the safety of life and property", subsequent congresses have repeatedly buttressed and elaborated upon the Commission's duty to award public-safety-oriented uses the highest allocation priority. See eg. S. Rep. No. 191, 97th Cong., 2d Sess. 14 (1981), reprinted in [1982] U.S. Code Cong. and ADM. News 2237, 2250 . . . "radio services which are necessary for the safety of life and property deserve more consideration in allocating spectrum than those services which are more in the nature of a convenience or a luxury." See also House Rep. No. 98-356, 98th Cong., 1st Sess. 27 (1983), Reprinted in [1983] U.S. Code Cong. and ADM. News 2219, 2237 . . . "public safety consideration should be a top priority when frequency allocations are made."

8/ National Association of Broadcasters v. FCC, 740 F.2d 1190, 1214 (1984).

B. The Commission's Proposed Transition and Future Operational Plan Does Not Meet the Needs of Incumbent OFS Licensees

10. Clearly, the proposed reallocation is contrary to the public interest. However, should the Commission conclude that the proposed reallocation must be made, the transition and operational plan as detailed in the Notice cannot provide for continued satisfactory operation of safety oriented OFS systems because the plan will not prevent the occurrence of objectionable interference to OFS transmissions. The current proposal would allow emerging technology interests licensed in the 2 GHz band to operate on a "co-primary" basis with pre-existing OFS entities. Accordingly, the critical operations conducted on these frequencies would be susceptible to -- and unable to obtain protection from -- interference created by the transmissions of new technology operators. The sensitive operations now conducted in this spectrum cannot tolerate any objectionable-level interference. Loss of signal at a critical moment could result in catastrophic consequences for the public. Accordingly, a rational transition and subsequent operations plan for accommodating new technologies in 2 GHz OFS spectrum must allow existing OFS facilities to operate on a primary basis and allow new technology interests to operate in the band on a purely secondary basis.

11. Moreover, the Commission must not allow new technology interests to utilize 2 GHz OFS frequencies until interference standards are established which will be adequate to eliminate potential interference to OFS operations. While EIA Bulletin 10D creates practical standards for analysis of interference between fixed operations, no standard currently exists to provide workable interference parameters for "fixed to mobile" communications. Such a standard must be developed prior to any use of the critical 2 GHz band by new technology interests, and the standard must be enforced so that interference potential to Questar's safety-oriented telecommunications activities will be minimized.

C. The Commission's Analysis is of Questionable Benefit Since Less Disruptive Alternative Spectrum Choices Were Not Considered

12. The Commission's proposal is primarily based on a spectrum study performed by the Agency's Office of Engineering and Technology (OET).[9/] The OET study and subsequent Notice, dismissed the possibility of using spectrum outside the 1-3 GHz range as a new technology reserve. This decision was apparently based on the Agency's belief that the availability of state-of-the-art technology

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9/ "Creating New Technology Bands for Emerging Telecommunications Technology" FCC/OET TS92-1 (January 1992).

for mobile equipment limits the proposed new services to spectrum below 3 GHz; and also because spectrum below 1 GHz does not appear to offer contiguous spectrum blocks of sufficient size to accommodate the needs of new technology interests.10/ The Commission refused to analyze these spectrum possibilities even though no specific evidence has been shown by the Commission that mobile technology will be incapable of using higher frequency ranges over the near term. The Commission must provide a detailed analysis of this issue, since significant contiguous blocks of spectrum above the 3 GHz range could be made available to meet the needs of new technologies without creating the massive disruption which will result should the proposed reallocation be adopted.

13. Moreover, the Commission is informed that in the "mini-cell" configuration in which certain of the proposed new technologies (PCS and data-PCS) are designed to operate, frequencies at higher ranges will provide more efficient re-use capability and better operating potential. This means that mobile equipment design using higher range spectrum options could prove easier than would be true should 1-3 GHz spectrum be allocated for new mobile technologies.11/

10/ Notice paragraph 12.

11/ See: Comments of the American Petroleum Institute in RM-7140, page 14.

14. The Commission also demonstrates a lack of serious analysis by its perfunctory refusal to analyze spectrum below the 1 GHz level for new technology accommodation. This is especially troublesome since it has been demonstrated that for low power transmission in urban environments such as those contemplated for PCS and data-PCS, frequencies below 1 GHz provide the optimal propagation characteristics with respect to penetration of buildings, leaded glass and other signal obstructions.12/ Moreover, frequencies outside the 1-3 GHz range are capable of performing acceptably for the proposed satellite-oriented new technologies such as low earth orbit satellite and digital audio broadcasting.

15. The Commission's study is further flawed since, even if the Commission could demonstrate that frequencies in the 1-3 GHz range are optimal for the proposed new technologies, careful review of OET's analytical criteria demonstrates that spectrum within the 1-3 GHz range other than the targeted bands can provide a more efficient, cost effective and significantly less disruptive home for new technologies. One megahertz of spectrum may be allocated for new technologies on a shared basis in the 2.50-2.60 GHz band since current operators in the Multipoint Distribution Service (MDS) and Instructional Fixed Television Service

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12/ See: Statement of Carl Bailey, f.4, supra.

(ITFS) use very little of the spectrum allocated to these services.13/ Another 120 megahertz of spectrum is available from the band 1.99-2.11 GHz. While this band is used for "broadcast auxiliary" operations which undoubtedly have some social value, the Commission has arbitrarily assigned such uses greater value than the health and safety protection operations now conducted in the target spectrum. This is an especially egregious choice because the use of OFS systems has increased substantially over the past decade in order to better ensure the public safety, while much of the electronic news gathering (ENG) activity performed in the broadcast auxiliary band has migrated to satellite technology in recent years. Moreover, broadcast auxiliary as well as MDS and ITFS operations do not require the absolute reliability which OFS operators must have to

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13/ While the Commission notes that several thousand applications for assignments in the MDS are pending, these applicants have no claim to a specific spectrum home on the basis of a simple application to the Commission. Additionally, Commission records indicate that only 94 "constructed and operational" wireless cable systems now operate in the entire U.S. Certainly these few users could more easily be moved to higher range spectrum which is adequate to meet their needs than could the thousands of OFS licensees who rely on long distance transmission properties of 2 GHz spectrum to meet their critical needs. Since the MDS and ITFS services generally operate over shorter range distances than the long haul OFS paths necessary to protect the public safety, the Commission could easily move the few licensees now operating in these bands to higher range frequency bands and could grant pending requests for authorization in the higher frequency ranges since higher range spectrum is readily available and will adequately perform in relatively short-distance operations such as MDS and ITFS.

Accordingly, the Commission must give serious consideration to the MDS/ITFS and broadcast auxiliary bands as spectrum reserve locations.

16. The Commission's decision not to examine the possibility or suitability of using federal government spectrum in the 1-3 GHz frequency range[14/] to accommodate of new technologies is highly dubious. The Commission apparently wishes to avoid attempts to use government dedicated spectrum to accommodate new technology interests because of a Commission belief that obtaining such spectrum would be time consuming and uncertain.[15/] Nonetheless, significant amounts of lightly used government spectrum are available in the 1-3 GHz range. Due to the extremely light use of the federal government band 1.71-1.85 GHz, Congress is now considering a requirement of reallocation of this band to private use. Moreover, the band 2200-2290 MHz which is dedicated to federal government operations is also lightly used and, the Commission is well aware that these bands could make excellent homes for new technology interests and provide new services without triggering a costly disruption of OFS services and the concomitant negative impact on public safety which reallocation of the targeted bands will create. The Commission must take into

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14/ Notice paragraph 21.

15/ Id.

account the potential utilization of government spectrum prior to any final allocation decision in this proceeding.16/

D. No Showing of Present Demand for New Technology Services Exists Sufficient to Warrant Reallocation of Critical 2 GHz Spectrum

17. The Commission claims that an allocation is needed to accommodate pending requests for new technologies including PCS, data-PCS, generic mobile satellite service, digital audio broadcasting and low earth orbit satellites.17/ The Commission apparently believes that sufficient near-term public demand for these services has materialized to require at least 230 megahertz of spectrum to be allocated to meet these needs. However, the Agency has not presented any empirical evidence indicating that such demand actually exists or will materialize in the near term.

18. Although new service proponents have suggested several technologies to the Commission, neither the Commission nor new technology proponents have offered

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16/ See: Motion to Suspend, FCC ET Docket No. 92-9, filed by Association of American Railroads, Large Public Power Council and the American Petroleum Institute (April 10, 1992).

17/ Notice paragraph 4.

evidence that serious marketing studies demonstrate current high demand levels; and, in fact, it is demonstrable that at least one of the new technologies proposed will have very limited overall market appeal.[18/] Accordingly, the Commission's proposal is premature since demand for new technologies has not been shown; and, even in those few instances where certain of the proposed new technologies have been made available, operations have not met with major consumer demand. Because no showing of demand for the proposed technologies has been made, and since the targeted spectrum serves vital public health and safety interests, the proposed reallocation is nothing less than an abrogation of the Commission's public interest responsibility.[19/]

E. International Developments Do Not Compel Domestic Reallocation

19. The Commission notes that certain of the proposed new technologies are "being considered or are under development" overseas[20/] with spectrum in the 1-3 GHz range being considered as a likely spectrum choice by foreign governments for deployment of new technologies. The

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18/ See: Reply Comments of the American Petroleum Institute, FCC Gen. Docket 90-314, pp. 12-13. See also Statement of John E. DeFeo at FCC en banc hearings on PCS (December 6, 1991).

19/ See ¶ 9, supra.

20/ Notice page 4.

Commission operates under an apparent belief that an identical domestic spectrum allocation will ensure both international equipment interoperability and increased communications equipment manufacturing in the U.S. for export purposes.

20. While international transmission standards might be desirable, a simple "common spectrum allocation" is insufficient to assure international interoperability and spur domestic equipment production. Different transmission methods for mobile technologies exist throughout the world and the software protocols which control mobile communications hardware vary widely from nation to nation. It appears that this situation will continue. Therefore, should a common allocation be agreed upon, international equipment interoperability would not likely be realized since signaling protocols would differ markedly. Further, numerous discrete frequency bands exist within the 1-3 GHz range. It is not certain at this time which specific bands or channels will be allocated by different nations to the specific technologies proposed. Accordingly, it is premature for the Commission to make early allocation decisions assigning specific bands to new services, since subsequent spectrum allocations of other nations may differ.

21. Nor will a "common allocation standard" stimulate domestic telecommunications equipment production since it is well known that once the "design stage" of a new technology is complete, equipment manufacturing generally moves offshore where the costs of labor are considerably lower. Questar concludes that the Commission's faith in a common frequency allocation to new technologies for stimulation of American manufacturing and exports is unfounded.

F. Should a New Technology Allocation be Inevitable, The Commission Must Designate a More Realistic Amount of Spectrum Than is Proposed

22. The Commission's spectrum study concluded that 220 MHz in the 1.85-2.20 GHz region "could be designated" for innovative technologies and services.[21/] The Commission then found that the entire 220 MHz should be allocated for emerging technologies.[22/] In reaching this conclusion, the Commission has overlooked two essential intermediate steps. Before the Agency decides to allocate the entire 220 MHz for emerging technologies, it must make a definitive finding that all of this spectrum is required to accommodate emerging technologies. Additionally, before the Commission can make a definitive finding concerning how much spectrum

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21/ Notice, paragraph 11.

22/ The Notice states that "(b)ased on the findings of our staff study, we propose to reallocate 220 MHz of the 1.85 to 2.20 GHz band that is currently used for private and common carrier fixed microwave services." Notice, paragraph 19.

is required for emerging technologies, it must define with some precision the emerging technologies that should be accommodated. It has failed to perform either of these two intermediate steps.

23. The 220 MHz proposed for allocation to emerging technologies significantly exceeds the total amount of spectrum now allocated by the Commission for both private and common carrier land mobile services. There is

seriously overstated the spectrum requirements for emerging technologies. In the process, the Commission has failed to articulate a reasonable basis for its proposal to reallocate such a lavish amount of valuable spectrum to speculative uses. Under applicable case law, an agency must "articulate with reasonable clarity its reasons for decision, and identify the significance of the crucial facts ...."[24/] The Commission's Notice does not satisfy this standard. Unless this situation is corrected, the Commission's allocation of 220 MHz for emerging technologies could be found to be arbitrary and capricious.

25. Questar respectfully urges the Commission to develop a more rational foundation for its ultimate decision in this proceeding. The Commission can do this by conducting a more deliberate and more profound examination of the legitimate spectrum requirements for the emerging technologies services. Certainly, "approximations" are an integral element of any attempt to anticipate future spectrum requirements. Nonetheless, where the Commission

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23/(...continued)
approximately ten interested applicants. The Commission therefore multiplied the spectrum required per system by the number of interested applicants and determined that 500 MHz of spectrum would be required for the entire allocation. There is no such logic to the determination, in this proceeding, that 220 MHz of spectrum is required for emerging technologies.

24/ Greater Boston Television Corporation v. FCC, 444 F.2d 841, 851 (D.C. Cir. 1970).

seeks to allocate, for services that will be largely land mobile in nature, more spectrum than is currently allocated for all existing land mobile services, it would appear that the Commission's estimate lacks any realistic sense of proportion.

26. The Commission can correct this deficiency by adopting a more thoughtful and realistic approach in this proceeding and, ultimately, by allocating a lesser amount of spectrum to accommodate emerging technologies. Questar is convinced that there is a fundamental flaw in allocating a total of 220 MHz for emerging technologies simply because that is the amount of spectrum which "could be designated" for such potential uses. The Commission must underpin its decision, from a procedural standpoint, by allocating a more realistic amount of spectrum for the services it intends to foster.

III. CONCLUSION

27. Questar is concerned that, through the instant proceeding, the Commission will use unsubstantiated claims of a need for instant deployment of new technologies to eject literally thousands of operations from spectrum which has been used successfully to protect the public and environmental safety for many years. Questar reminds the